DEN-SIN®

ULTIMATE WATER JETTING SOLUTION

H-110-200E

ELECTRICAL POWERED
HEAVY DUTY HOT WATER
HIGH PRESSURE CLEANER

USER GUIDE & SPARE PARTS MANUAL

www.densin.com

Introductions

Congratulations on your purchase of the **DEN-SIN** High Pressure Cleaner.

Model: H-110E, H-200E

Read this user manual before you start up your High Pressure Cleaner the first time.

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This machine is a High Pressure Cleaner producing water jet under high-pressure, which is why severe injuries can occur if the safety precautions are not observed.
Therefore a full understanding of the contents of this instruction manual is required, in order to prevent injuries to you, objects and persons near-by.

Safety
The following symbols are used in this manual to indicate procedures that if not followed, may results in personal injuries or damage to equipment.

WARNING is used to alert the reader of procedures or practice which if not followed correctly could result in personal injuries.

CAUTION is used to alert the reader of procedures or practice which if not followed correctly could result in damage to machine or other equipment.

NOTE is used to highlight important information that may assist the reader carrying out the procedure or understanding the text.

The information contained in this user guide is subject to change without notice.

Version 00: May 2015

Revision History

Date	Revision	Rev.No.

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DENSIN

1. Getting acquainted with your High Pressure Cleaner

Fast and efficient cleaning

The **DEN-SIN** high-pressure hot-water cleaners in the H-110E, H-200E series enables you to get more cleaning done in less time.

This series of **DEN-SIN** high-pressure cleaners offers you high performance yet a compact design. The compact design enables the machines to be agile within inconvenient places, and the high performance and possibility to use hot water gives you the opportunity to solve an array of cleaning tasks. The high-pressure cleaners in this series are designed for industrial use as well as for cleaning contractors. All pump parts, fittings and pipes in contact with water are made of non-corrosive materials. Together with the ceramic pistons, long life seals and stainless steel valves, it ensures long life and high durability.

Specifications

Model	Motor		Motor Speed	Working Pressure		Flow Capacity		Power Supply	Dimension LxWxH	Weight
	Hp	kW	rpm	psi	Bar	gpm	l/min	Voltage	mm	kg
H-110E	3.0	2.2	1400	1600	110	3.1	11	230 / 1ph / 50Hz 220 / 1ph / 60Hz	940x650x880	110
H-200E	7.5	5.5	1400	2900	200	4.4	15	380~415 / 3ph / 50Hz 220/440 / 3ph / 60Hz	940x650x880	125

Applications

These heavy-duty high-pressure cleaners are capable of removing any kind of dirt. The high pressure cleaner can function as both cold and hot water cleaner:

Algae off concrete constructions
Paint and graffiti off walls
Dust, dirt, soil & mud off floors
Oil & grease off engines and other mechanical parts
Dirt and salt deposits off ship decks
The High pressure cleaner has built in chemical injector

And with the option for use of accessories even many more jobs are to be dealt with:

Sand-blasting
Drain-cleaning
Dispensing of soaps and chemicals
Floor cleaning equipment
Rotary brushes

This machine is only to be used for the purposes it is designed for. Any other use shall be considered improper and therefore potentially dangerous. The manufacturer is not to be held responsible for any damages caused by improper use.

Unpacking

Remove the high-pressure cleaner and its accessories from the packing material. For transport and packing reasons some accessories may be supplied disassembled.

Make sure all components are present:

- High-pressure machine itself
- Electrical cord (attached)
- High pressure hose with Spray-gun trigger
- Double barrel lance
- Water inlet male hose coupling

Installation

-**M**ount the high-pressure hose on to the high-pressure cleaner by pulling back the retainer on the high-pressure hose coupling, while sliding it on the male part positioned on the bottom rear of the high-pressure cleaner.

-**M**ount the assembled spray-lance by pushing forward the front of the trigger gun and slide in the male swivel coupling part of the spray-lance.

-**P**repare the water supply for the high-pressure cleaner, by connecting one end of the water supply hose to a fresh water tap. Insert the end with the male coupling into the female inlet quick coupling located at bottom rear of the machine. Turn on the tap.
Notice: Connection to the public mains water supply according to regulations.

-**P**ut the power-plug into a main power supply socket and turn on the power. Switch on the high-pressure cleaner by depressing the on/off switch.

-**T**he high pressure cleaner is now ready for operation. The spray-gun lance will experience a recoil force during operation – therefore keep a firm grip with both hands on the Spray-gun handle and the lance. Press the trigger and start cleaning.

-**P**ressure can be regulated by adjusting the knob on the spray-gun lance.

-**W**hen using the chemical injector, pressure must be adjusted to low.

Make sure your local power supply specifications are in accordance with the motors requirement. Refer to the ID-plate on the machine. Do Not run the High Pressure Cleaner without sufficient potable water supply as it can cause cavitation and serious damage to internal pump parts. Do not let the machine recycle the water (running with Spray-gun trigger not activated) for more than a few minutes as this can cause serious damage to the seals.

Operation

To prevent accidents from happening, ensure the safety of the person(s) who uses the equipment and to protect bystanders and nearby placed inventory or machinery, a few safety precautions needs attention.

1) Treat the machine as a high-speed cutting tool.

2) Anyone under the age of 18 is NOT allowed to use the machine.

3) Always use a proper plug and socket specially designed with ground to earth wiring. Only connect to an installation with earth wiring. A certified electrician shall make the installation. It is strongly recommended that the electric supply to the machine include a Residual Current Device/GFCI.

4) Always keep the Water Blaster and its accessories in good working condition. Check the machine for defects, especially the insulation on the electric cable. Do NOT start up the machine if there is any defect. Have the machine serviced.

5) When using the Water Blaster and its accessories, eye protection must be worn to protect against repelling or ricocheting matters causing eye damage.

6) Suitable clothing and footwear must be worn while using the equipment to protect the operator. Do not try to clean clothes or footwear with the machine.

7) Precautions must be made to keep bystanders away from the working range.

8) Do NOT spray-clean on yourself, others or live animals. The high-pressure beams are capable of making severe injuries.

9) Do NOT spray at electrical equipment OR the machine itself.

10) While repairing or servicing the equipment and its accessories always make sure the machine is turned off and disconnected from the main power supply.

11) Only allow instructed personnel to operate the machine.

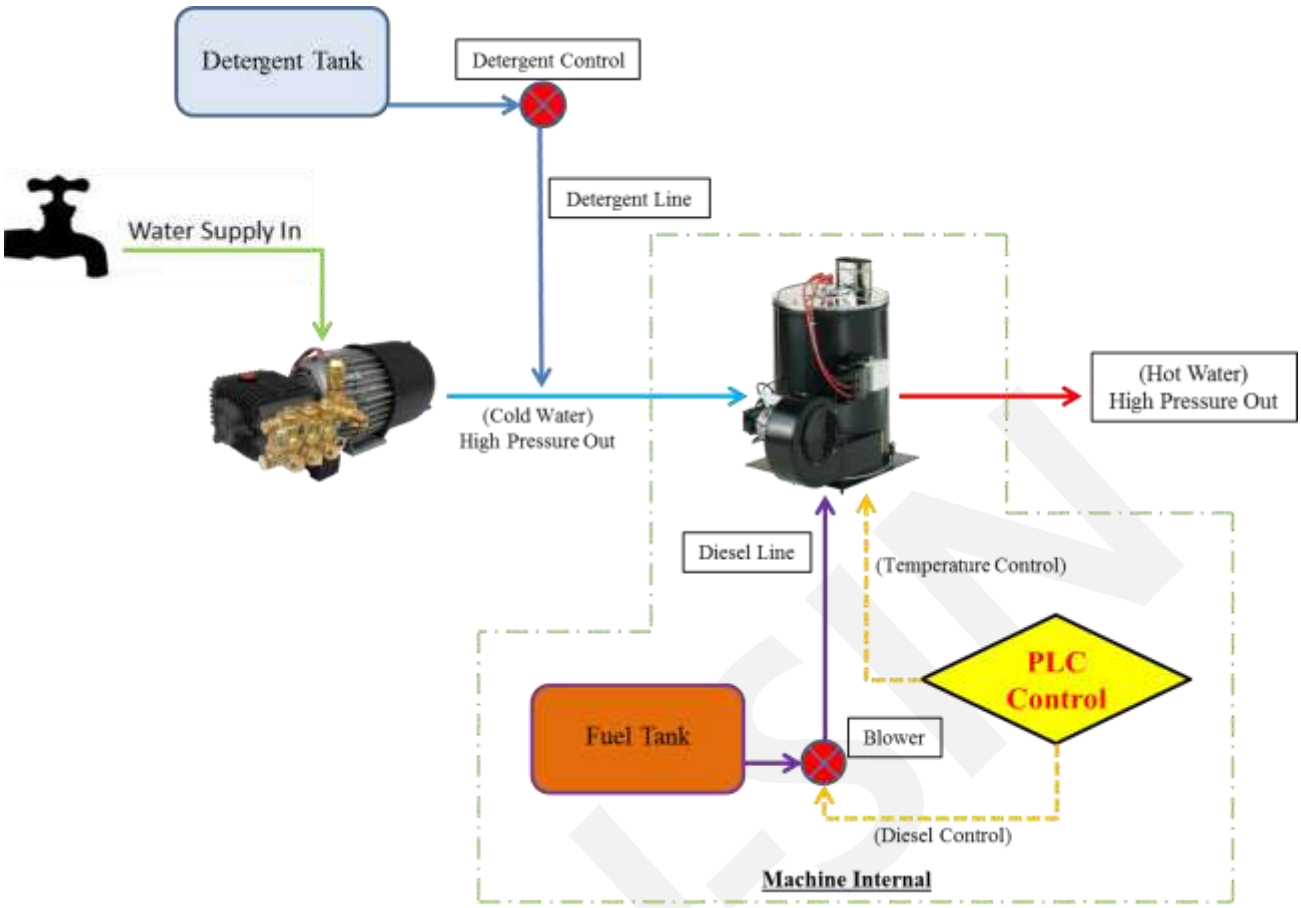
12) Activating the trigger/gun can cause backward force therefore always hold spray lance with both hands.

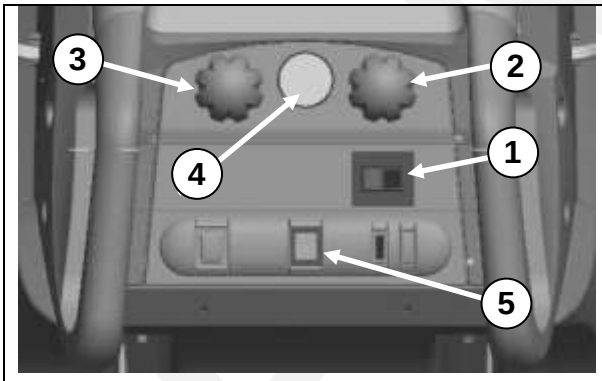
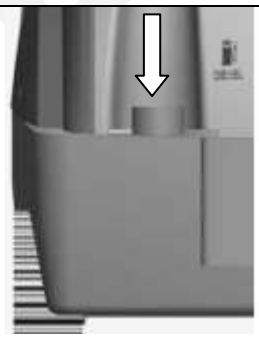
13) When pausing during operation, turned off the main switch of the machine and ensures that the trigger/gun is locked.

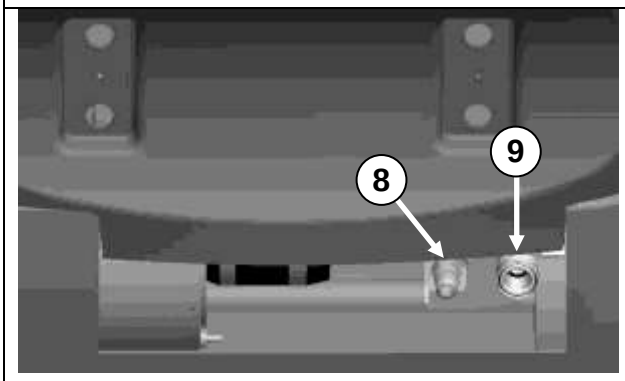
14) Only use high-pressure hoses, connections and nozzles specified by DEN-SIN.

15) IMPORTANT – Do not use the machine in a possible explosive environment in accordance with EN-50014.

Operation Flow Diagram



	**1)** On/Off switch Start and stop the machine by depressing this switch. **2)** Temperature Control Adjust temperature by turning the knob. **3)** Chemical Suction Control Adjust chemical suction by adjusting the knob. **4)** Pressure Gauge **5)** Boiler switch Start and stop the boiler by depressing this switch. Note: Chemical can only be dispense at low pressure
	**6) Fuel Tank (Capacity : 18L)** Fill the fuel tank to the left side with automotive quality Diesel. Note: The Diesel Fuel tank must be filled with diesel in order for the machine to operate as a hot water cleaner.

	7) Chemical Tank (Capacity : 5L) Fill the Chemical tank with desired type of chemical, suitable for the cleaning task.
	**8)** High Pressure Male Outlet Connect to high pressure hose **9)** Low Pressure Female Inlet Connect to water supply

The machine would operate only as a cold-water high pressure cleaner if only the on/off switch was depressed. By pressing the boiler switch, the boiler would be turned on and the machine would function as a hot water cleaner. Temperature of the water could be achieved by turning the temperature control knob.

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2. Safety and protection information

General safety & application guidelines

1) **I**t is not allowed to clean asbestos containing surfaces with high-pressure, unless using special equipment.
2) **P**ersons under the influence of alcohol, drugs or medicine should not operate the machine.
3) **D**o not touch plug and socket with wet hands.
4) **T**his machine has been constructed for use with Nilfisk-ALTO detergents. The use of other detergents or chemicals may cause problems as to the operation and the safety.
5) **W**hen using detergents the instructions should always be strictly observed.
6) **A**lways flush the machine with clean water after use of chemical/detergents.
7) **A**lways unplug power supply when cleaning and maintaining the machine.
8) **D**o not use machine if important parts are damaged – i.e. safety devices, high-pressure hoses, spray handle.
9) **T**he user is obliged to observe all national working environment and working safety regulations concerning "operation of high-pressure washers".
10) **I**t is not allowed to connect this machine directly to a potable water supply.
11) **I**f the machine is to be connected to potable water supply it is strictly necessary to fit the machine with a water break tank, in accordance with EN1717.

Safety devices

The machine is equipped with the following safety devices:

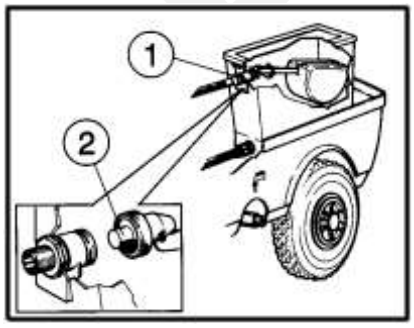
1) **S**top button. The stop button stops the machine when pushed.
2) **L**ocking device on spray-gun handle. The locking device prevents the trigger from being activated when pulled out.
3) **T**hermal sensor and over load relay protects the motor against overloading. The machine can be switched on again after a few minutes, when the sensor has cooled.
4) **B**urner safety devices; the burner safety device protects the machine against faulty ignition.

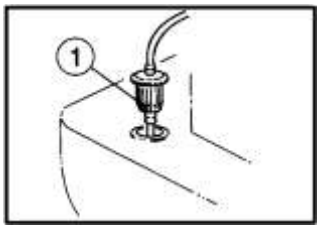
DO	DON'T

3. Maintenance and troubleshooting

Maintenance

Subject	Matter / Procedure
Lubrication	*Oil renewal of the pump crankcase is to be completed the first time after no more than **50 hours of use**. Oil renewal is hereafter to be completed in every **500 hours of use**.* Renewal of oil: Turn off the high-pressure cleaner. Dismount the hexagon screw at the bottom of the pump housing. Allow the oil to drain into a waste oil-tray. Remount the hexagon screw and add oil through the oil inlet on top of the pump until the red point of the oil control glass has been reached. Approx. 0.4kg of oil, type **SAE 30 W**, is to be used. **Notice:** Do not dispose of used oil in drain.
Cleaning	*Use a damp cloth to wipe the cabinet. Do not use detergent cleaning chemicals.* **Notice:** To prevent electrical shock. **DO NOT SPRAY DIRECTLY UPON THE MACHINE WITH HIGH PRESSURE.** *Occasionally clean the fan cover positioned at the back of the motor, to ensure sufficient airflow.* *Do NOT operate the machine with damaged or removed fan cover.*
Inspection	*To prevent electrical shock and spills of leaking water. Check electrical cord and high-pressure hose for wear and cracks. Keep coupling parts free of dirt to ensure long life of O-ring seals preventing water leak.* **Notice:** To prevent damage on hoses and cord, be careful not to have them run over by heavy vehicles or squeezed in door openings etc. Replace if necessary.
Storage	Be sure the cleaner is kept frost-free, if not possible flush the pump of the cleaner with antifreeze fluids.

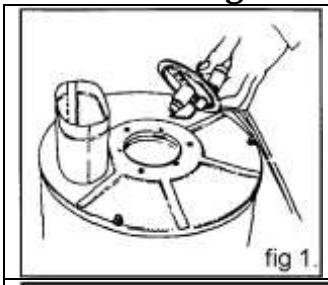
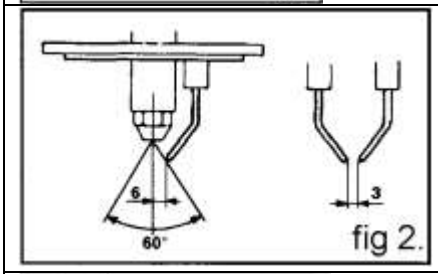
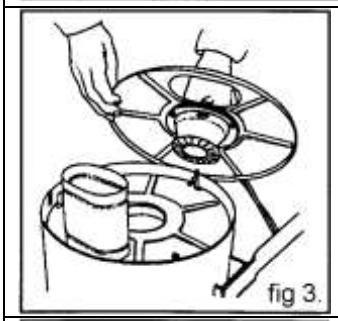
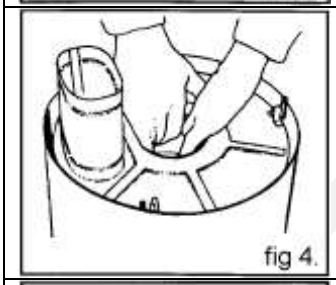
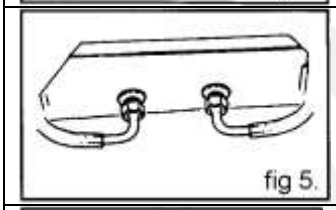
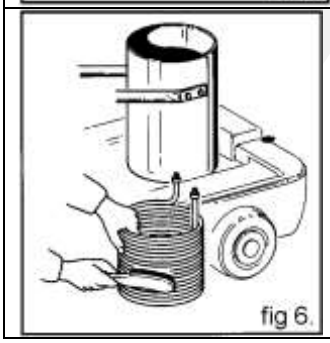




Depending on water quality, clean the strainer in the water tank regularly.

Depending on Fuel quality clean the fuel filter regularly.

Boiler cleaning & maintenance / 200hours*

 fig 1.	Carefully remove the nozzle holder flange and the electrodes holder (boiler burner head). ***Clean the small glass in the flange every 50 hours of use.**
 fig 2.	Clean the fuel nozzle filter with compressed air and check the position and wear of the spark electrodes.
 fig 3.	Remove the boiler cap by unscrewing the 3 nuts and clean the deflector with a brush and/or with compressed air.
 fig 4.	Manually take away the interior cap.
 fig 5.	Remove the high pressure hoses and unscrew the locking nuts from beneath. Pull out the boiler coil.
 fig 6.	Clean the boiler coil for residue with a wire brush. Vacuum clean the residue from the boiler housing.

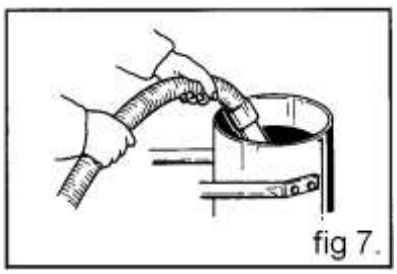


fig 7.

Troubleshooting

Symptom	Cause and Rectification
When the main switch is turned on the high-pressure cleaner will not run.	*Fault somewhere in the power supply.* Make sure the socket is inserted correctly. Inspect cord for cracks and wears. Check if fuse is blown, replace if necessary.
The motor is humming but the pump does not start.	*Too low voltage, one phase is missing (on three phase model only) High-pressure pump is blocked.* Check the mains voltage. Check the connection box voltage with a meter. With the machine turned off, turn the motor, at the fan, if it remains blocked check the pump.
The pressure drops and the high-pressure cleaner works irregularly.	*The strain filter is clogged or the water supply from the tap is insufficient.* Clean the strain water filter. If there isn't enough water-flow through the tap, ensure sufficient water supply.
The pump continuously stops and starts, when the spray-gun trigger is activated.	*The high pressure nozzle is partly clogged.* Turn off the high-pressure cleaner, dismantle the high-pressure nozzle and remove the extraneous matter. Replace if damaged.
The high pressure cleaner does not reach the proper working pressure when the spray-gun handle is activated.	*The high-pressure nozzle is clogged or there is dirt in the by-pass valve. The pump sucks air.* Turn off the high-pressure cleaner. Clean the nozzle. Inspect the low pressure supply, Or while the spray-gun trigger is activated turn the machine on again. Repeat the procedure again; now with the trigger released. If the problem still occurs, the by-pass valve should be dismantled and the extraneous matter removed.
The high-pressure cleaner only works with approximately 2/3 of the maximum pressure, and the high-pressure hose is vibrating	*There is dirt in the valves.* Turn off the high-pressure cleaner. Dismantle the valve bolts and the valves, remove any dirt and check to ensure the valve flaps are movable and fits tightly.

(Continues)

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(Continued)

Symptom	Cause and correction
Noisiness	*The pump sucks air. One or more valve springs are broken or down. Extraneous matter in the valves. Crankcase or motor bearings worn out.* Inspect the low-pressure supply. Replace springs. Clean the valves. Replace the bearings.
Water in the oil	*The O-ring casing is worn out. High moisture in the air (condensing inside the crankcase) The seals are completely worn out.* Check or replace the O-ring. Renewal of the crankcase oil more often. Replace the seals.
The boiler will not burn	*The fuel tank is empty. The fuel filter is clogged. The fuel nozzle is clogged. The spark electrodes are worn or out of alignment. The flame censor device is active. The glass between the flame censor and the boiler is dirty.* Fill up the fuel-tank. Clean or replace the fuel filter. Clean or replace the fuel nozzle. Adjust or replace the spark electrodes. Reset the device by pushing the reset button at the control panel. Clean the glass between the censor and boiler.
When using chemical injector	
The high-pressure cleaner does not suck chemicals	*The chemical container is empty. The high-pressure cleaner has not been set to low-pressure (on the double barrel lance cock). The low-pressure nozzle is clogged, or partly clogged. The non-return valve of the chemical injector is stuck.* Ensure the chemical container contains sufficient fluid for proper suction. Set the spray-lance to low pressure by turning the cock on the lance counter-clockwise. Clean or replace the low-pressure nozzle. Clean, correct or replace the non-return valve of the chemical injector.

For any further inconveniences, not mentioned in this user guide or any damages of the machine, we strongly suggest you to make contact with your dealer for the repair or possible replacement of any original spare-parts.

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Service Instructions

Detach the high pressure hose, dump back hose, inlet hose, safety valve, and parts on the pump head before serving the pump.

Please refer to Pump assembly (Page 22 & 25) unless otherwise stated.

Servicing the valves:

1. *Remove the valve cap.*
2. *Inspect the valve cap O-Ring for any damage, replace if necessary.*
3. *Use the needle nose pliers to remove the valve.*
4. *Use a small probe to move the poppet up and down to assure that the valve is functioning properly and that no debris is stuck in the valve.*
5. *To reassemble the valves proceed the other way round and tighten the cover screws with a torque wrench. (Referring to torque specification)*

Servicing the Packing/Seals:

1. Remove the bolts on the head of the pump.
2. Place the screwdrivers between the pump head and crankcase of the pump, lifting one up and the other down. The head should start to lift off of the plungers.

3. When you remove the head, some of the water seals have stayed on the plungers and some in the head. To remove the seals from the plungers, simple turn the assemblies and pull off.

4. If the seal assemblies are in the head use the reversible pliers to grab the seal retainer on the outside ring, twist the retainer in either direction and lift out.

5. Pull out the guide ring with your finger.
6. Pull the high-pressure seal and support ring out of the head with your finger.
7. The low-pressure seal is located in the brass seal retainer. Using the mechanics pick, go in between the seal and retainer and pull the seal straight out.
8. Remove the seal retainer O-Ring with mechanics pick.
9. To reassemble the packing and seals proceed the other way round and tighten the cover screws with a torque wrench. (Referring to torque specification)

Servicing the Plungers:

Recommend to replace Piston kits, Support Rings kits, and Water Seals kits whenever servicing the plungers.

1. Remove the plunger retainer nut.
2. Insert the gasket scraper between the copper washer and plunger to remove the washer.
3. Twist and pull the plunger off the plunger rod.

4. Remove the plunger rod O-Ring with the mechanics pick.
5. Remove the washer. And clean any thread locker that is left on the plunger rod and retaining nut threads.
6. To reassemble the plungers, proceed the other way round and tighten the cover screws with a torque wrench. (Referring to torque specification)

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Pump head to drive end Installation:

1. Turn the crankshaft to align the plungers as shown.

2. Place the head evenly onto the plungers and push it until it makes contact with the drive end of the pump.

3. Torque the head bolts as shown in the tightening sequence diagram.

Torque Specification:

Descriptions	Pump Head	Piston Nut	Valve Cap
In .lbs	133	106	442
Kg.m/N.m	15	12	50

4. Accessories List

Accessories

ACCESSORIES	PART NO:
Rotary brush.	700550462
Foam injector	700550156
Foam lance.	700550464
Foam sprayer.	700550463
Extension hose with quick couplings. from 10 - 50 m	Please inquire
Industrial drain cleaner (1 front, 3 rear jets).	700550508
Container for sandblasting grid, including regulator.	Please inquire
Floor cleaner	700550465
Retractable hose reel.	700550208

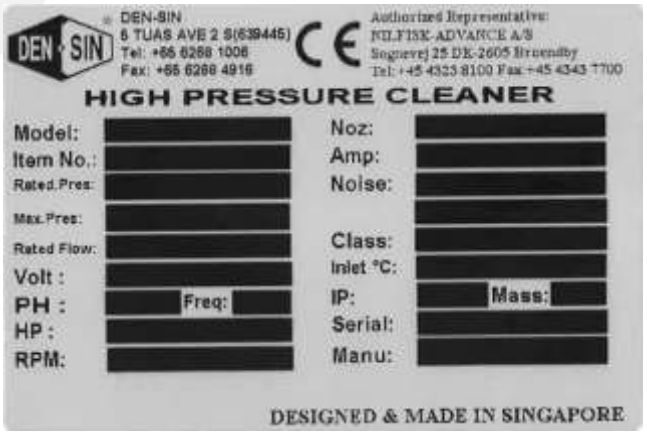
Accessories	H-110E 50/60HZ	H-200E 50/60HZ
**Double Barrel Lance	700550457	700550456
*Single Barrel Lance	700550450	700550449
**Short Double Barrel Lance	700550490	700550488
Single Barrel Lance with Rotating Nozzle	700550470	700550171
**Double Barrel Contractor Lance with side Regulator Handle	700550193	700551286
Single Barrel Lance with Multi-speed Nozzle	700551289	700550890
Industrial Sandblaster Kit with boron Carbide Nozzle	700550480	700550479

* With Straight Jet Nozzle **With Fan Jet Nozzle

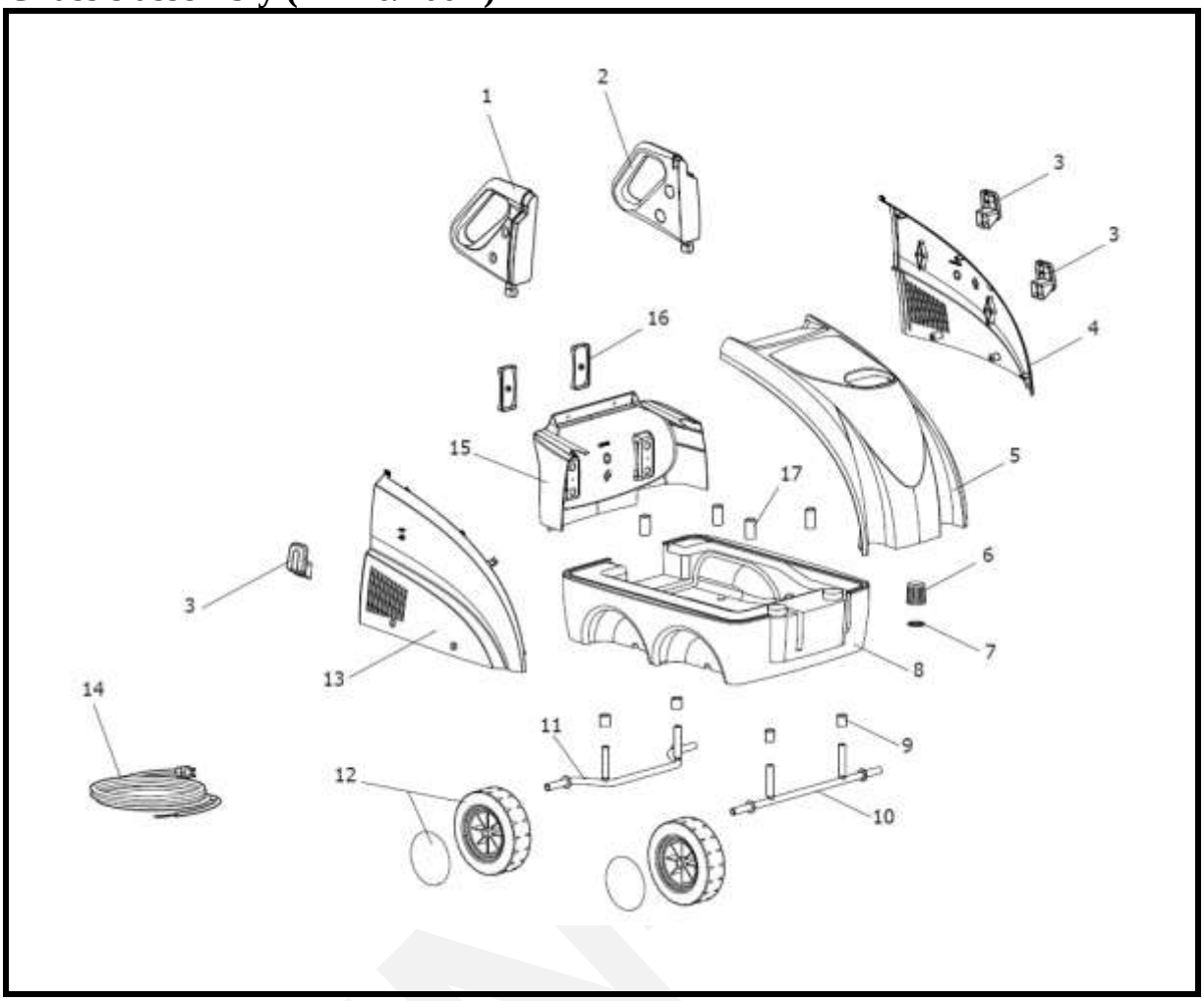
Notice: Always state type of high-pressure cleaner along with the part no when ordering accessories or spare-parts.

ID-plate

Refer to the identification plate on the machine:



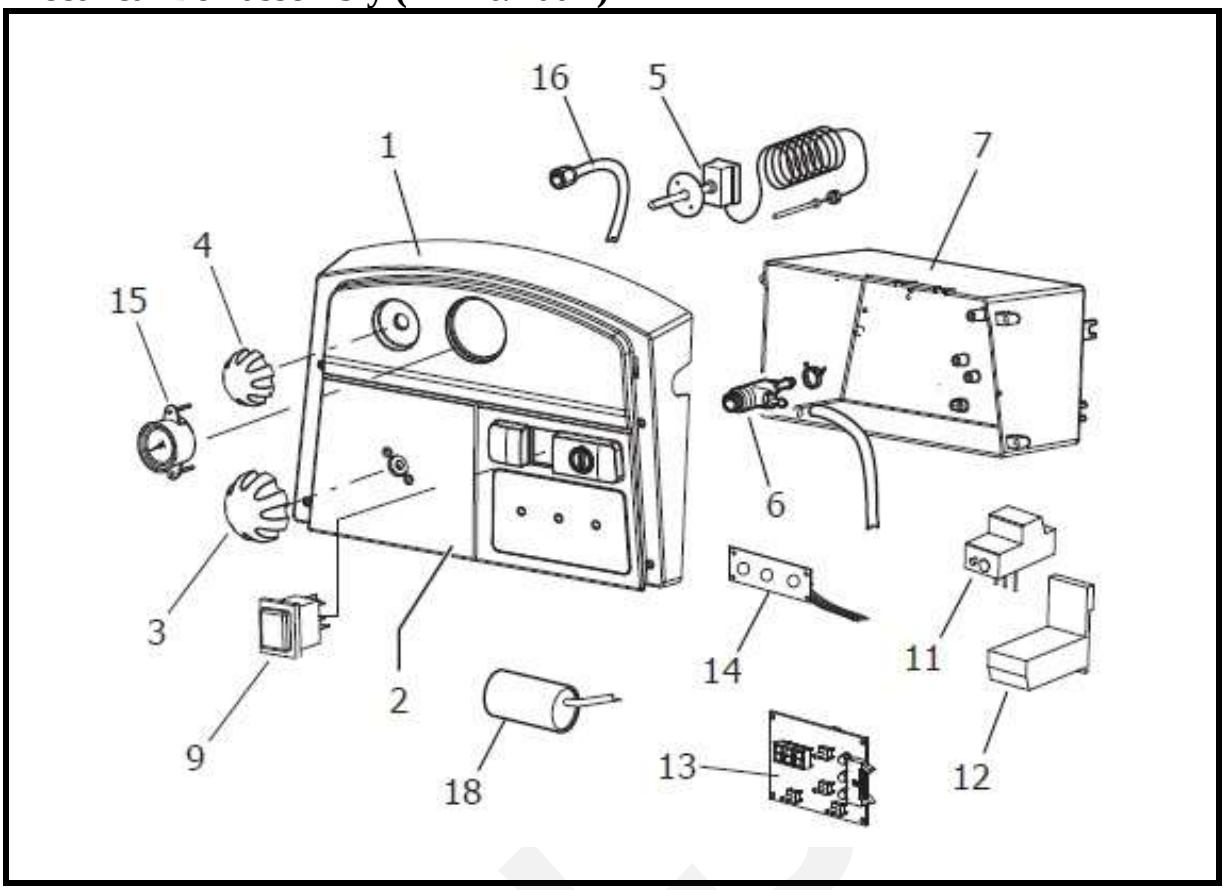
Chassis assembly (H-110/200E)



Chassis assembly spare-parts list

Pos:	Part No:	Qty:	Description
1	700520582	1	Right Handle
2	700520583	1	Left Handle
3	-	3	Cable Hook
4	700590058	1	Left Cover
5	700590057	1	Top Cover
6	700520155	2	Diesel/Chemical Tank Cap
7	700540358	2	Gasket
8	700520580	1	Diesel/Detergent Tank
9	-	4	Short Spacer
10	-	1	Front Wheel Axle
11	-	1	Back Wheel Axle
12	700590060	4	Wheels w/ Cover
13	700590059	1	Right Cover
14	700951501	10m	Cable 3G2.5 H-110E 50/60Hz
	700951502		Cable 4G2.5 H-200E 50/60Hz
15	700520581	1	Back Cover
16	-	2	Roller Cap
17	-	4	Long Spacer

Electrical Box assembly (H-110/200E)

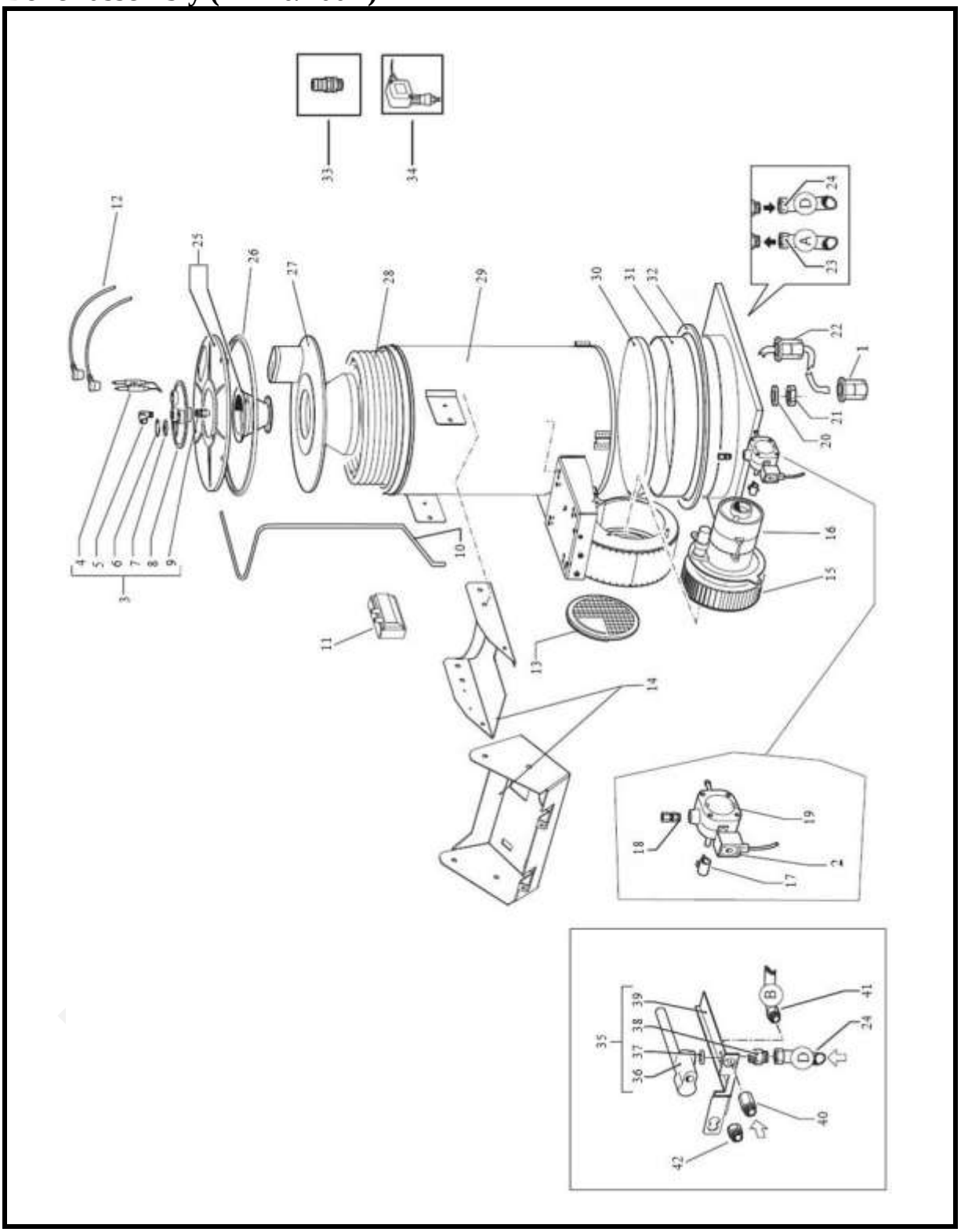


Electrical Box assembly spare-parts list

Pos:	Part No:	Qty:	Description	
1	700520586	1	Circuit Board Frame	
2	700590090	1	Control Panel	
3	700530598	1	Thermostat Knob	
4	700590091	1	Thermostat Handle Black	
5	700530267	1	Thermostat	
6	700540777	1	Detergent Regulator	
7	700530599	1	Electrical Box	
8	-	-	-	
9	700590092	1	Switch	
10	-	-	-	
11	700530841	1	Thermal Relay 12-18A	H-110/200E 50/60Hz
	700530256		Thermal Relay 16-24A	H-200E 220V 60Hz
12	700530842	1	Contactor	H-110E 50/60Hz
			Contactor	H-200E 400V 50Hz
			Contactor	H-200E 440V 60Hz
			Contactor	H-200 220V 60Hz
13	700590093	1	PLC Circuit Board	
14	700590094	1	LED Electrical Board	
15	700530736	1	Pressure Gauge	
16	700540776	1	Gauge Hose	
18*	700530765	1	Capacitor 65uF	H-110E 50Hz
	700530848		Capacitor 90uF	H-110E 60Hz

** Capacitor not needed for H-200E Machines*

Boiler assembly (H-110/200E)

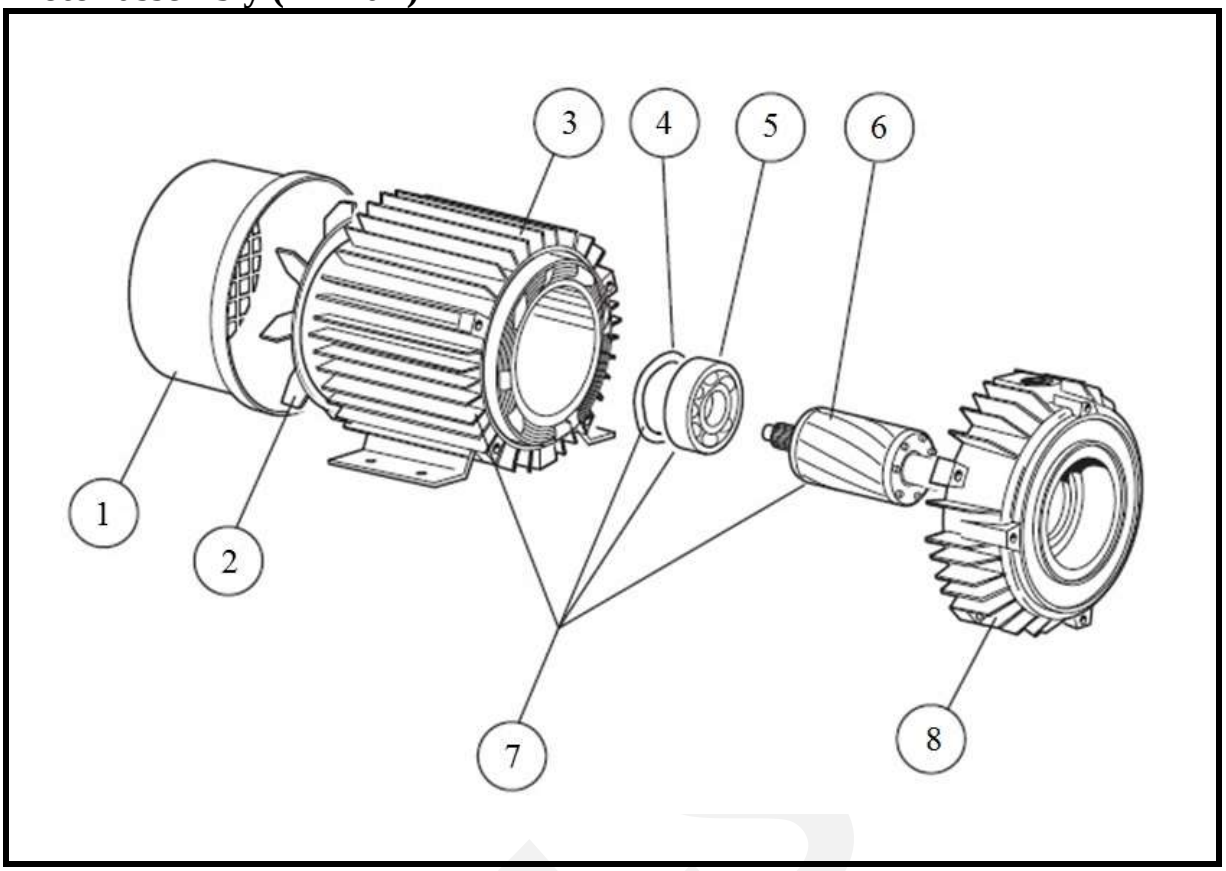


Boiler assembly spare-parts list

Pos:	Part No:	Qty:	Description	
1	700550026	1	Diesel Strainer	
2	700590028	1	Blower Coil	H-110E 50/60Hz
	700590118		Blower Coil	H-200E 50/60Hz
3	700590095	1	Boiler Flange Complete	H-110E 50/60Hz
	700590118		Boiler Flange Complete	H-200E 50/60Hz
4	700590039	1	Ignition Electrode	
5	700590040	1	Conic Connection	
6	-	1	Ring Seeger	
7	700590003	1	Sight Glass	
8	-	1	Wrought Burner Flange	
9	-	1	Diesel Nozzle 1.25	H-110E 50/60Hz
	-		Diesel Nozzle 1.50	H-200E 50/60Hz
10	700590047	1	Inlet Hose for Diesel	
11	700590096	1	Ignition Transformer	H-110/200E 50Hz
	700590141		Ignition Transformer	H-200E 440V 60Hz
	700590142		Ignition Transformer	H-200E 220V 60Hz
12	700530791	2	Electrode L=370mm	
13	700590006	1	Fan Protection Cage	
14	700520587	1	Holder Board/Handles	
15	700590008	1	Blower Fan	
16	700590046	1	Blower Motor 50Hz	H-110/200E 50Hz
	700590009		Blower Motor 60Hz	H-200E 60Hz
17	700590010	1	Coupling Fuel Pump Plastic	
18	700590040	1	Conic Connection	
19	700590097	1	Gas Pump Double Hose	
20	-	2	Washer	
21	700590013	1	Nut 1/2" Brass	
22	700590098	1	Oil Filter Unit	
23	700590050	1	Hose 5/16” L=600mm	
24	700590051	1	Hose 3/8” L=375mm	
25	700590099	1	Burner Cover	
26	-	1	Band for Burner Cover	
27	700590021	1	Chimney for Boiler	
28	700590100	1	Burner Coil	H-110E 50/60Hz
	700590120		Burner Coil	H-200E 50/60Hz
29	700590101	1	Boiler Body	
30	700590031	1	Refractory Bottom	
31	700590043	1	Coil Fixing Strip Plate	
32	700590036	1	Insulating Rope for Boiler Base	
33*	700590102	1	Max Pressure Valve	
34	700530155	1	Pressure Switch 1/4"	
35	700590103	1	Bulb Thermostat Set	
36	-	1	Bulb Assembly	
37	-	1	Washer	
38	-	1	Coupling Nipple 1/2"-3/8”	
39	-	1	Bulb Bracket	
40	700590104	1	Adaptor 3/8”	H-110E 50/60Hz
	700590121		Suction Connector M22	H-200E 50/60Hz
41	700590105	1	Tube D.20 3/8”M L=450mm	H-110E 50/60Hz
	700590122		Hose Low Pressure L=400mm	H-200E 50/60Hz
42	700540113	1	Nipple 3/8”	

** For H-110E 50/60Hz Machines only*

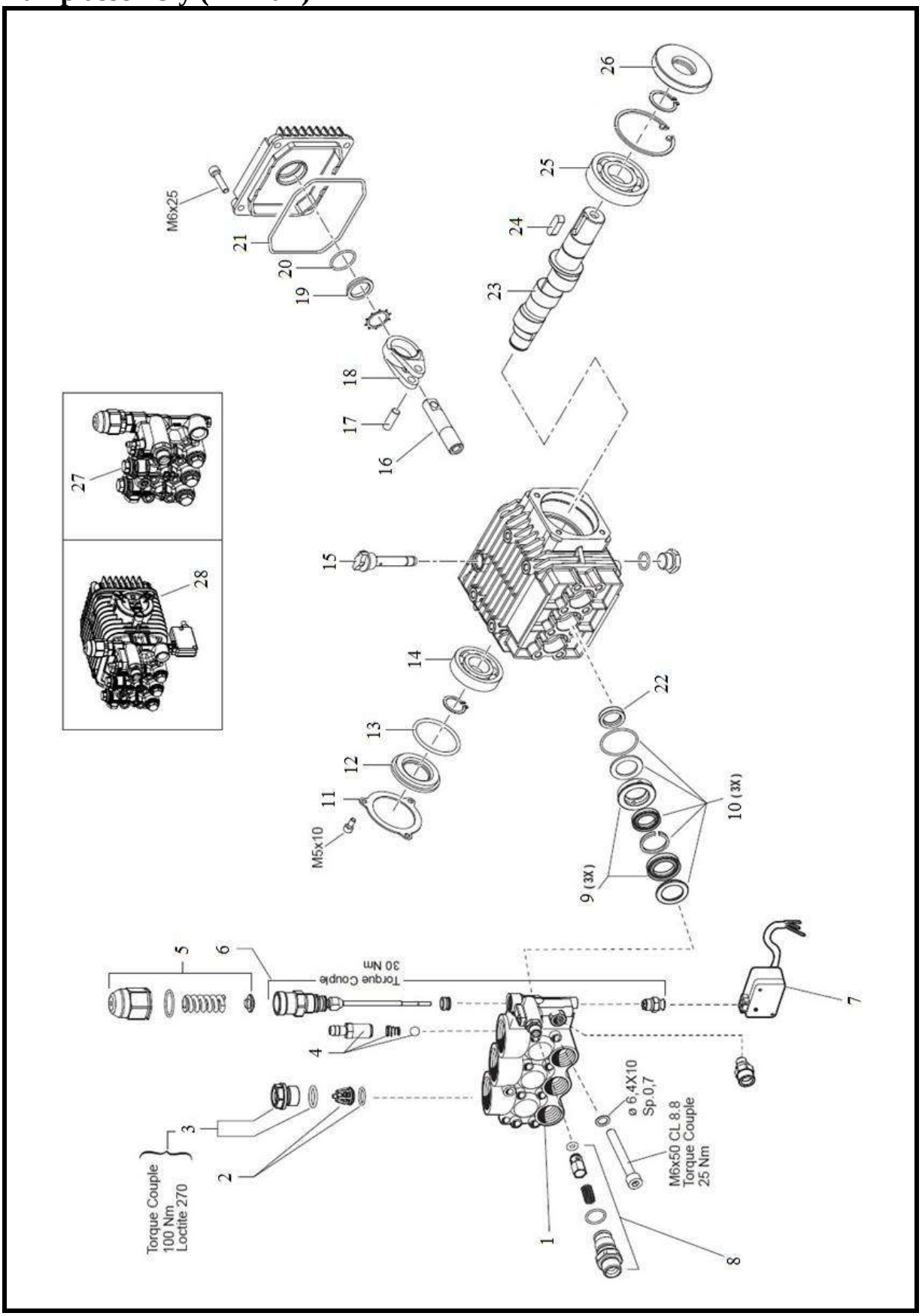
Motor assembly (H-110E)



Motor assembly spare-parts list

Pos:	Part No:	Qty:	Description
1	-	1	Motor Fan Cover
2	700590061	1	Motor Fan
3	-	1	Motor Housing
4	700590062	1	Unloading Ring
5	700590063	1	Bearing
6	-	1	Rotor Shaft
7	700590106	1	Motor Complete
8	-	1	Motor Flange

Pump assembly (H-110E)



Pump assembly spare-parts list

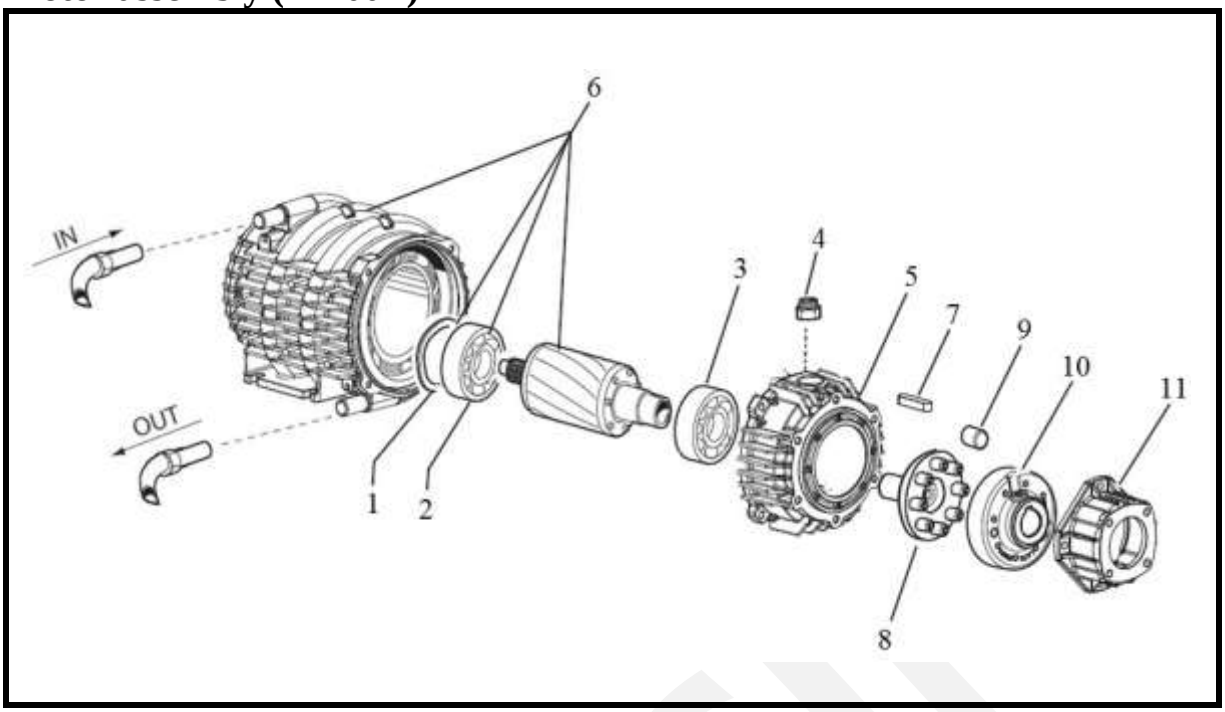
Pos:	Part No:	Qty:	Description
1	-	1	Pump Head
2**	Kit A	1	Valve Kit
3	-	1	Suction Valve Cap
4	700590066	1	Detergent Suction Connector
5	Kit B	1	Pressure Regulator Kit
6	700590068	1	Bypass Valve
7	700590069	1	Greybox with Micro Switch
8	700590070	1	Injector
9*	Kit C	1	Bushing Kit
10*	Kit D	1	Water Gasket Kit
11	700590073	1	Clamp Cap
12	700590074	1	Side Cover
13	700590075	1	O-Ring
14	700590077	1	Bearing
15	700590078	1	Oil Level Pole
16	700590079	3	Piston Ceramic ∅15mm
17	700590080	3	Conrod Plug
18	700590081	3	Conrod Complete
19	700590082	1	Oil Indicator
20	700590083	1	O-Ring
21	700590084	1	O-Ring
22	700590085	3	Oil Seal
23	700590086	1	Pump Shaft ∅24mm
24	700590087	1	Pump Shaft Key
25	700590088	1	Bearing
26	700590089	1	Seal Ring
27	700590107	1	Pump Head Complete w/ Unloader
28	700590064	1	Pump Complete H-110E H-110E 50/60Hz

Pump repair kits

Kit description	Pos:	Qty:	Description:
Kit A (700590065)	2	6	Valve Kit
Kit B (700590067)	5	1	Pressure Regulator Kit
Kit C (700590071)	9	3	Bushing Kit
Kit D (700590072)	10	3	Water Gasket Kit

*(*) **3** kits for each Pump*
*(**) **6** kits for each Pump*

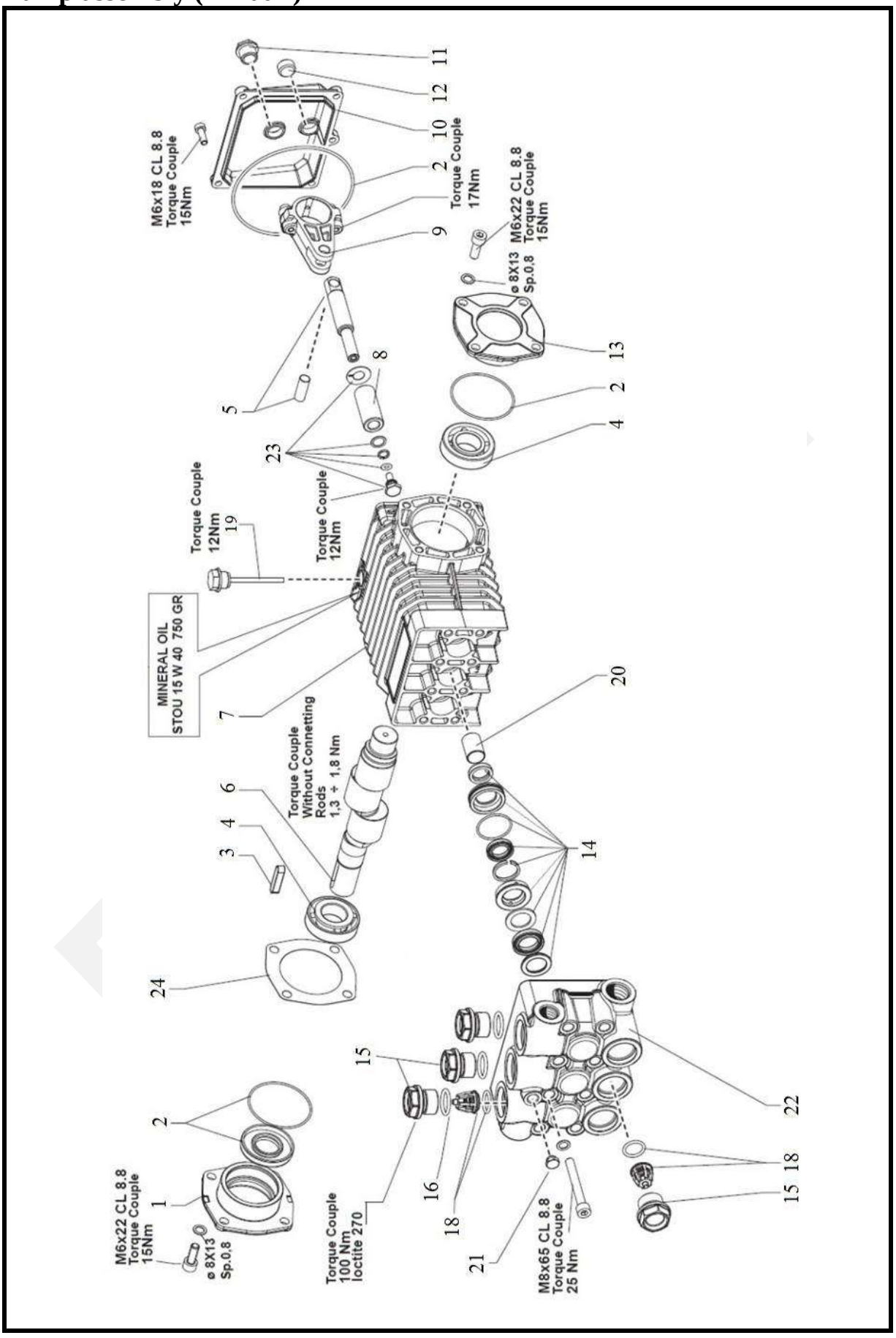
Motor assembly (H-200E)



Motor assembly spare-parts list

Pos:	Part No:	Qty:	Description
1	700590109	1	Ring
2	700590110	1	Radial Sphere Bearing
3	700590111	1	Bearing Front
4	-	1	Cable Holder
5	-	1	Motor Flange
6	700590108	1	Motor 7.5HP H-200E 380V 50Hz
	700590140		Motor 7.5HP H-200E 220/440V 60Hz
7	700590112	1	Feather Key
8	-	1	Joint ∅24mm – Motor
9	700590113	1	Elastic Rubber Coupling
10	-	1	Joint ∅24mm – Pump
11	-	1	Pump Flange

Pump assembly (H-200E)



Pump assembly spare-parts list

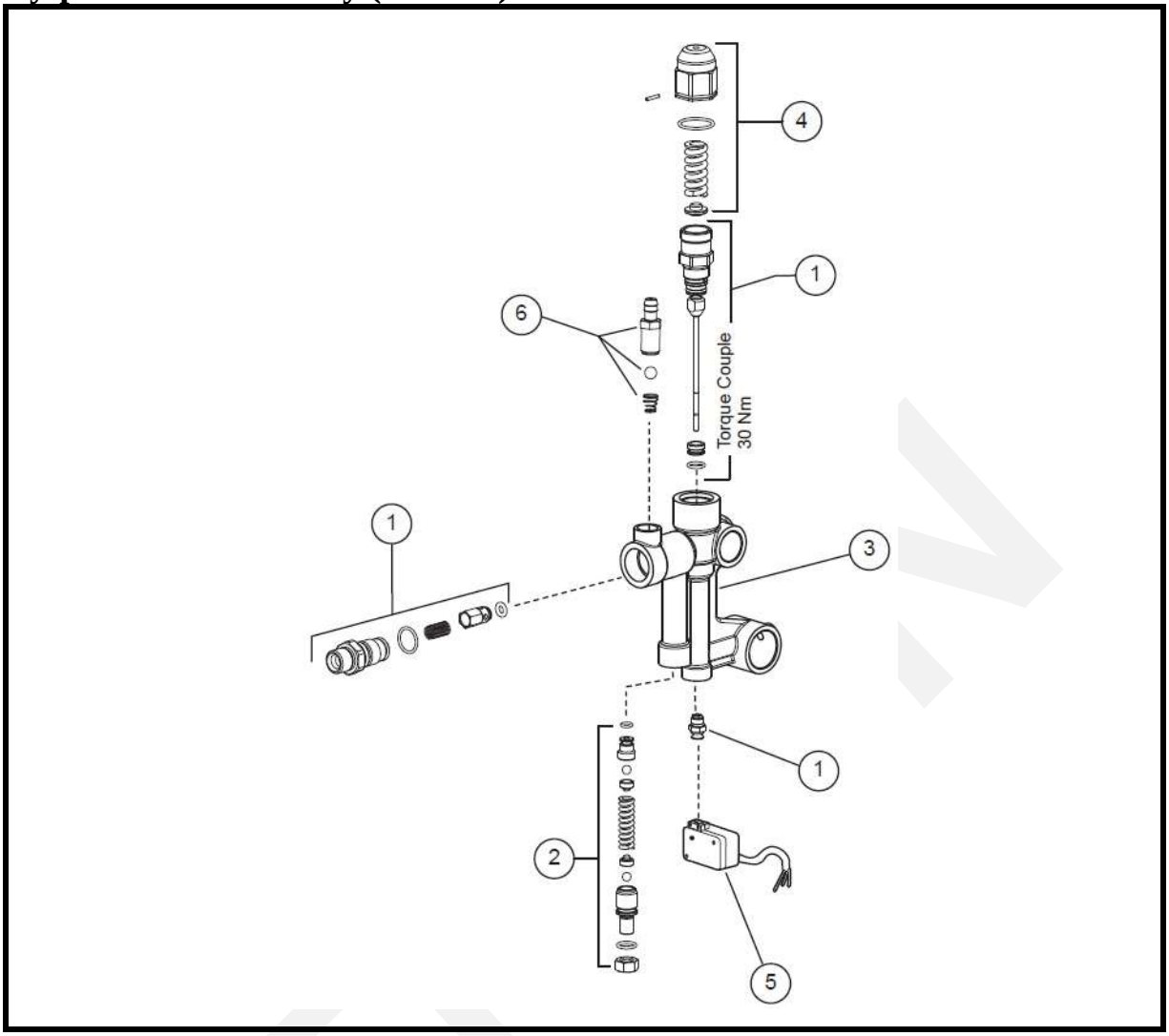
Pos:	Part No:	Qty:	Description
1	-	1	Bearing Flange (Back)
2	Kit G	1	O-Rings Kit
3	700590125	1	Pump Shaft Key
4	700590126	1	Bearing Kit
5	700590127	1	Plunger Rod with Plug
6	700590128	1	Pump Shaft ∅24mm
7	-	1	Crankcase
8*	Kit H	1	Piston Kit ∅20mm
9	700590130	1	Conrod Complete
10	-	1	Rear Crankcase Cover
11	700590131	1	Oil Level Indicator
12	-	1	Oil Discharge Cap
13	-	1	Bearing Flange (Front)
14*	Kit I	1	Water Seal/Bushing Kit
15	-	6	Suction Delivery Plug
16	700590133	6	O-Ring
17	-	1	Holed Valve Cap 1/4"
18**	Kit J	1	Valve Kit
19	700590135	1	Oil Cap
20	700590136	1	Piston Bushing
21	-	1	Holed Valve Cap 1/4"
22	700590137	1	Pump Head
23	Kit K	1	Piston Screw Kit
24*	700590139	1	Bearing Spacer
1-24	700590123	1	Pump Complete H-200E H-200E 50/60Hz

Pump repair kits

Kit description	Pos:	Qty:	Description:
Kit G (700590124)	2	1	O-Rings Kit
Kit H (700590129)	8	3	Piston Kit ∅20mm
Kit I (700590132)	14	3	Water Seal/Bushing Kit
Kit J (700590134)	18	6	Valve Kit
Kit K (700590138)	23	3	Piston Screw Kit

*(*) **3** kits for each Pump*
*(**) **6** kits for each Pump*

By-pass valve assembly (H-200E)



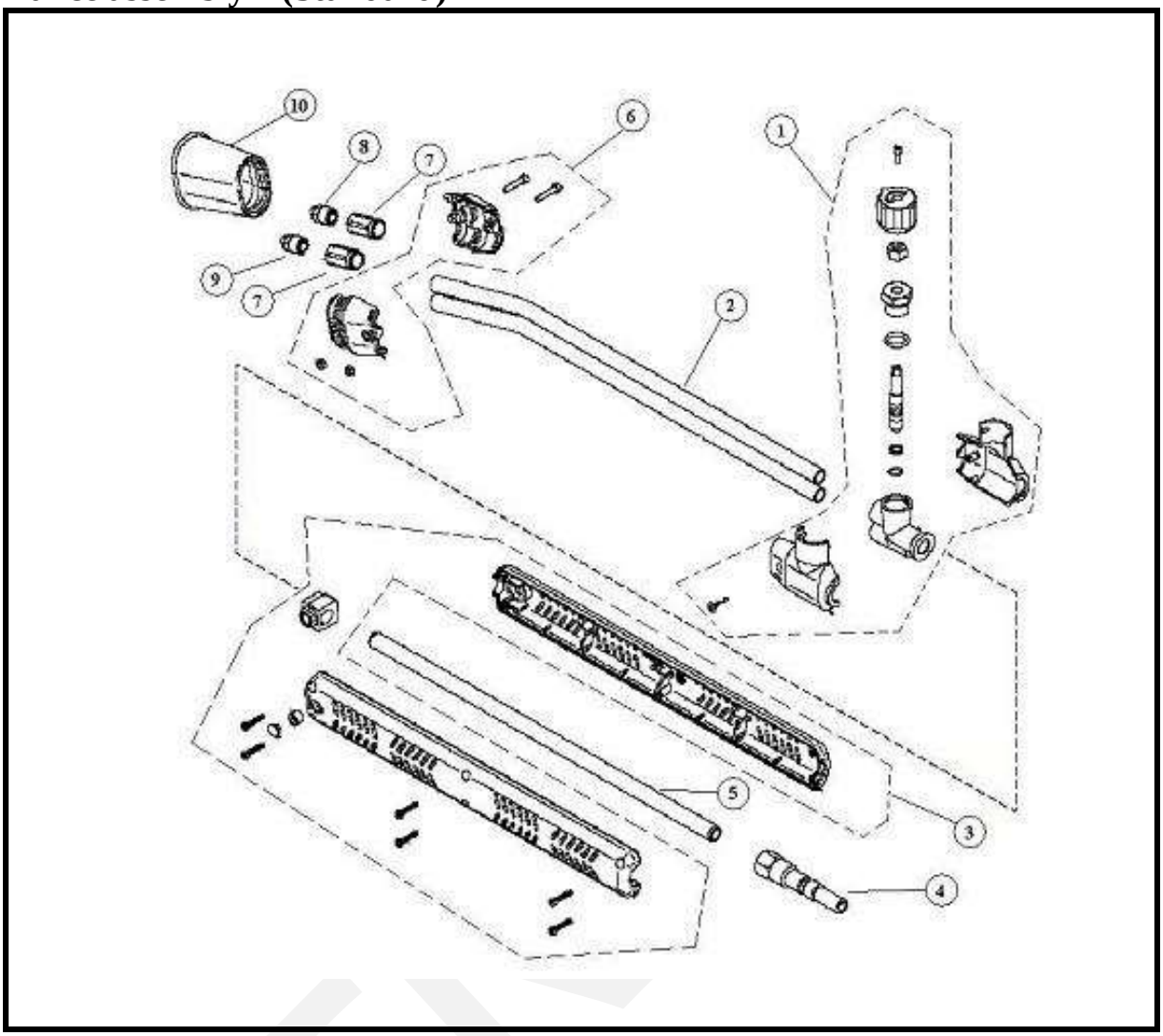
By-pass valve assembly spare-parts list

Pos:	Part No:	Qty:	Description
1	Kit E	1	Bypass Kit
2	Kit F	1	Pressure Valve Kit
3	-	1	Body Bypass Valve
4	Kit B	1	Pressure Regulator Kit
5	700590069	1	Greybox with Micro Switch
1-5	700590117	1	Unloader Valve Complete

By-pass valve repair kits

Kit description	Pos:	Qty:	Description:
Kit B (700590067)	4	1	Pressure Regulator Kit
Kit E (700590114)	1	1	Bypass Kit
Kit F (700590115)	2	1	Pressure Valve Kit

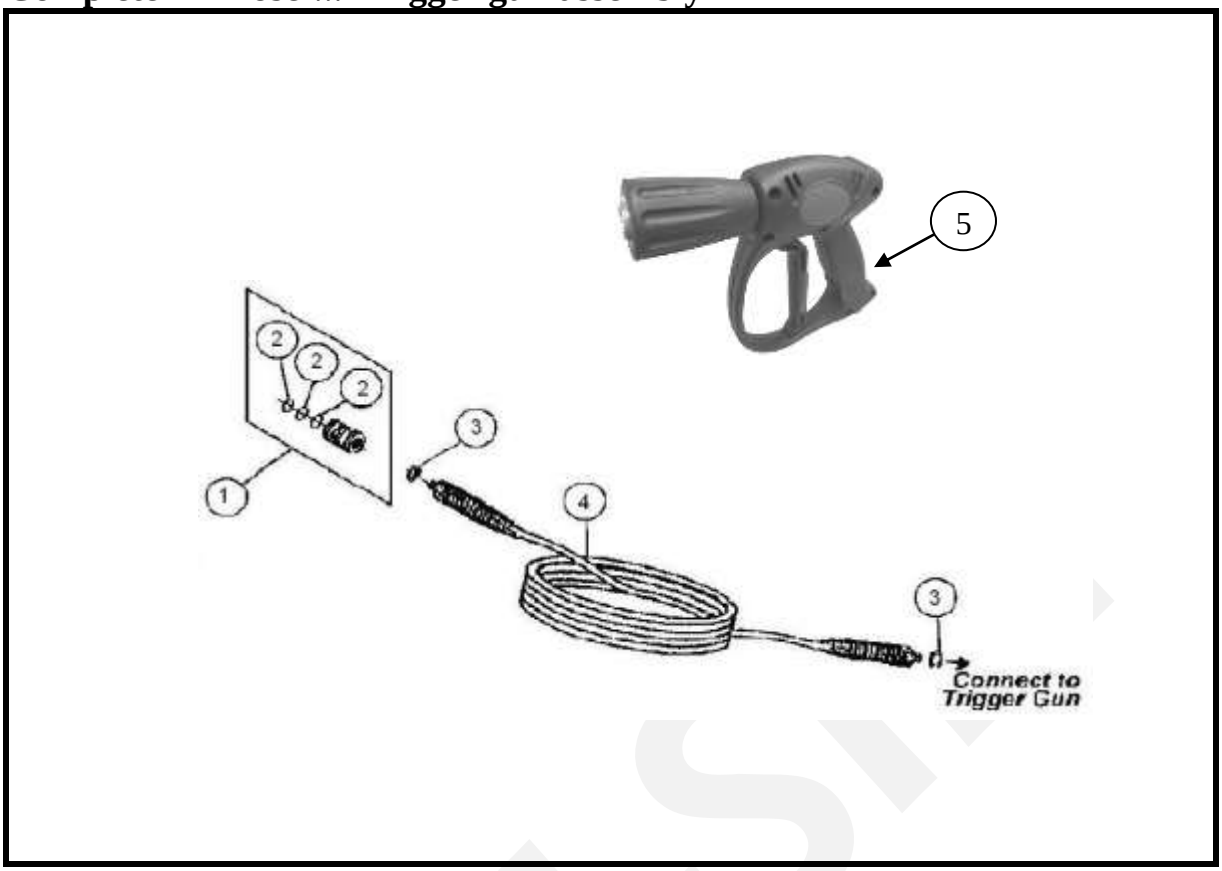
Lance assembly 1 (Standard)



Lance assembly spare-parts list

Pos:	Part No:	Qty:	Description
1	700551471	1	Needle valve
2	700951001 700951001	1	Lance Pipe Top Lance Pipe Bottom
3	700551470	1	Lance Guard L+R Complete w/ Screws And Holder
4	700551469	1	Nipple, Quick Coupling Male
5	700951001	1	Lance Pipe For Double Barrel Lance
6	-	1	Nozzle Guard complete
7	700550013	2	Bushing, High Pressure Nozzle Holder 1/4"
8	-	1	Nozzle Low Pressure
1-8	700551395	1	Lance D.B complete w/o nozzle
9	700550015	1	Nozzle 15045
1-9	700551473	1	Double Barrel Lance Complete Noz15045

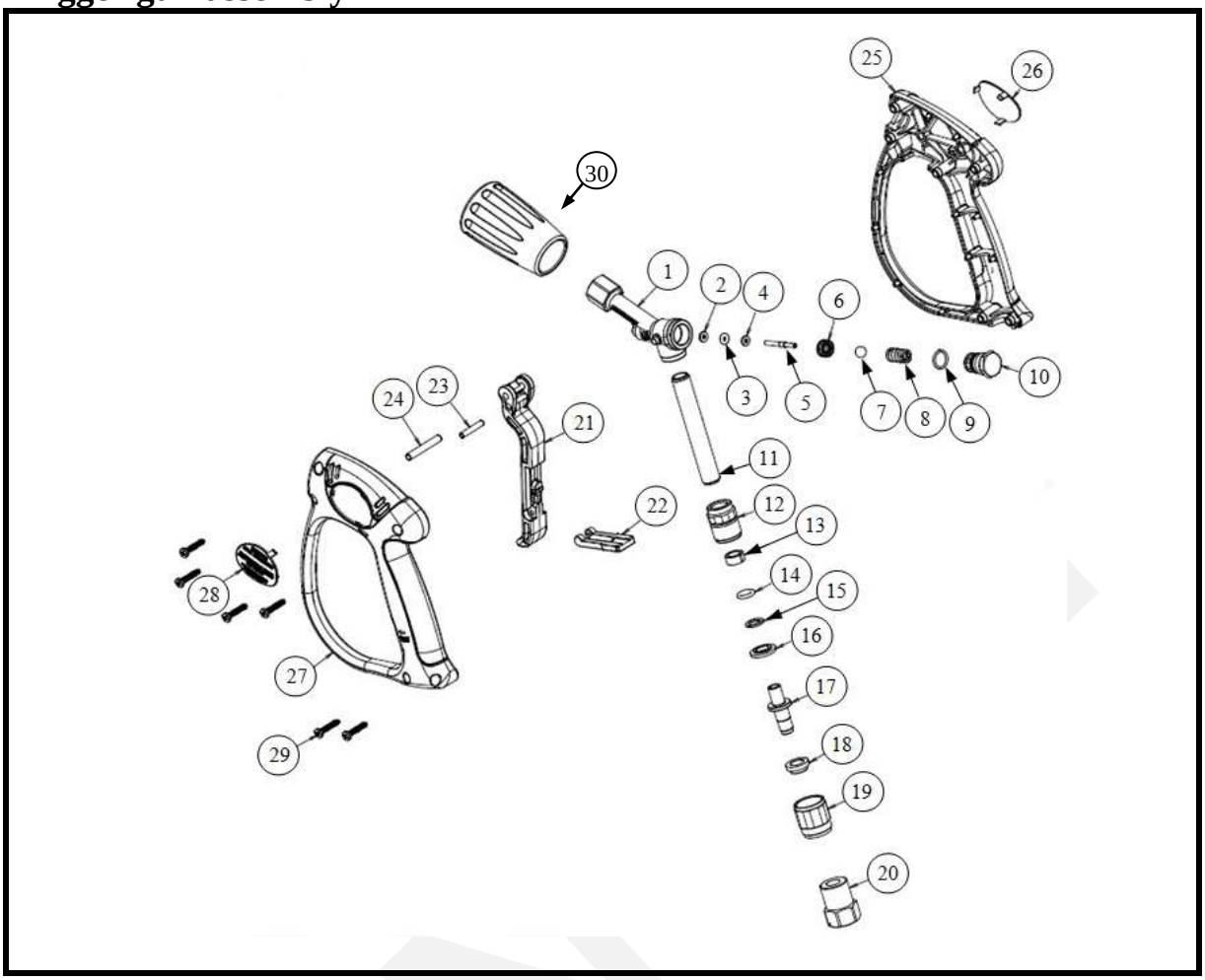
Complete HP hose w/ Trigger gun assembly



Complete HP hose w/ Trigger gun spare part list

Pos:	Part No:	Qty:	Description
1	700550003	1	Quick Coupling Female High Pressure
2	700540491	3	O-Ring
3	700550004	2	Dowty Seal 3/8”
4	700550039	1	High Pressure Hose 3/8” R1T 10m Length
5	700551511	1	Trigger Gun Complete
1-5	700551512	1	Hose HP 10m+Quick Coupling+Gun

Trigger gun assembly



Trigger gun assembly spare-parts list

Pos:	Part no.:	Qty.:	Description:
1	-	1	Body
2	Kit F	1	Anti Extrusion Ring
3		1	O-Ring
4		1	Washer
5		1	Pin Press Sphere
6		1	Seat
7		1	Sphere 5/16
8	-	1	Spring S.S
9	Kit F	1	O-Ring
10	-	1	Plug
11	-	1	Pipe
12	-	1	Coupling G1/4F Outlet SW Top
13	Kit G	1	Bushing
14		1	O-Ring
15		1	Anti Extrusion Ring
16		1	Spacer
17		1	Rotating Joint Pin
18		1	Nut with Step
19	-	1	Nipple
20	700551521	1	Coupling G3/8F Inlet SW Top

21	-	1	Lever
22	-	1	Trigger Safety Lock
23	-	1	Lever Pivot D4x22
24	-	1	Lever Pivot D5x33
25	-	1	Right Trigger Cover
26	-	1	Right Label
27	-	1	Left Trigger Cover
28	-	1	Left Label
29	-	1	Screw
30	700551522	1	Quick Coupling Female Complete
1-30	700551511	1	Trigger Gun Complete

Trigger Gun Repair Kits

Kit description	Pos:	Qty:	Description:
Kit F – 700551517 Seat Gasket Repair Kit	2	1	Anti Extrusion Ring
	3	1	O-Ring
	4	1	Washer
	5	1	Pin Press Sphere
	6	1	Seat
	7	1	Sphere 5/16
	9	1	O-Ring
Kit G - 700551520 Swivel Repair Kit	13	1	Bushing
	14	1	O-Ring
	15	1	Anti Extrusion Ring
	16	1	Spacer
	17	1	Rotating Joint Pin
	18	1	Nut with Step

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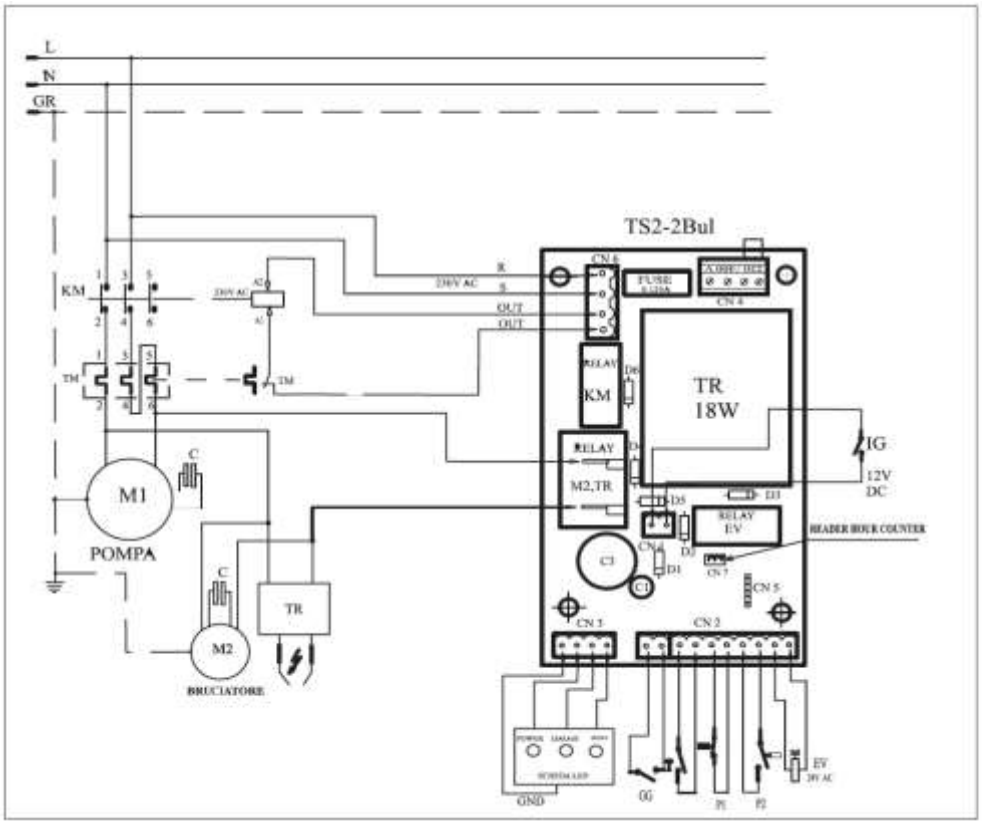
Wiring diagrams

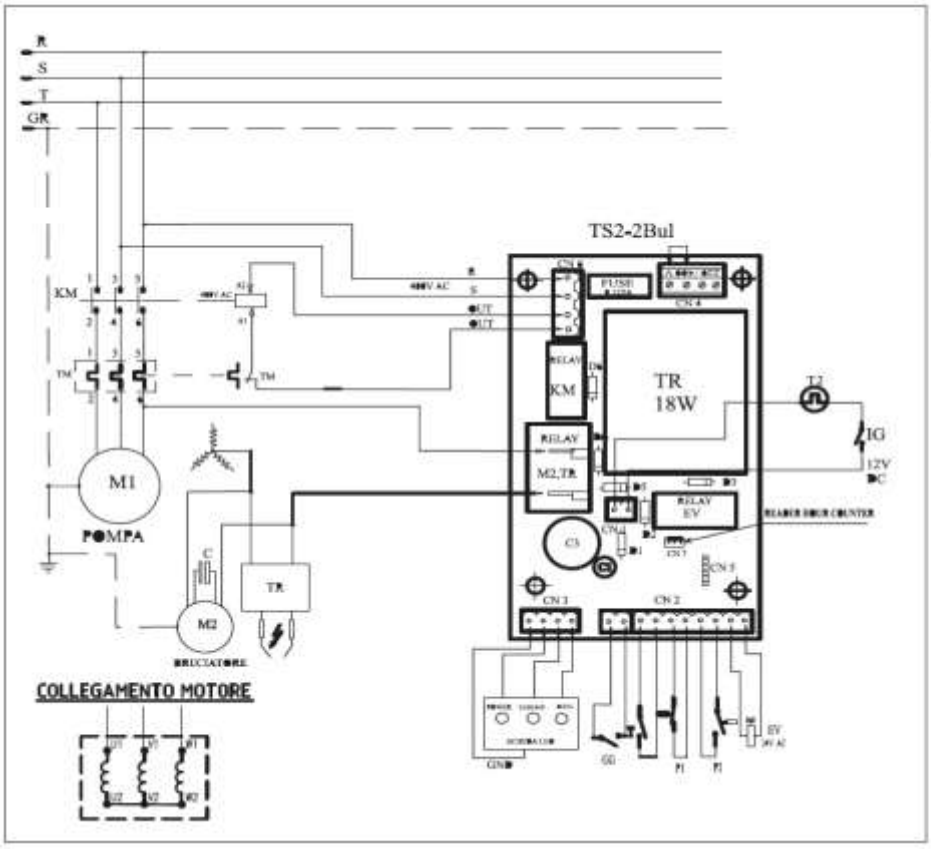
H-110E 220~230V 50/60Hz Standard



LEGEND

KM = CONTACTOR
T = THERMOSTAT
GG = DIESEL FLOATER
P1 = PRESSURE SWITCH TS
P2 = PRESSURE SWITCH
EV = ELECTRO-VALVE
TM = MOTOR THERMAL SWITCH
TR = IGNITION TRANSFORMER
IG = ELECTRIC-PUMP SWITCH

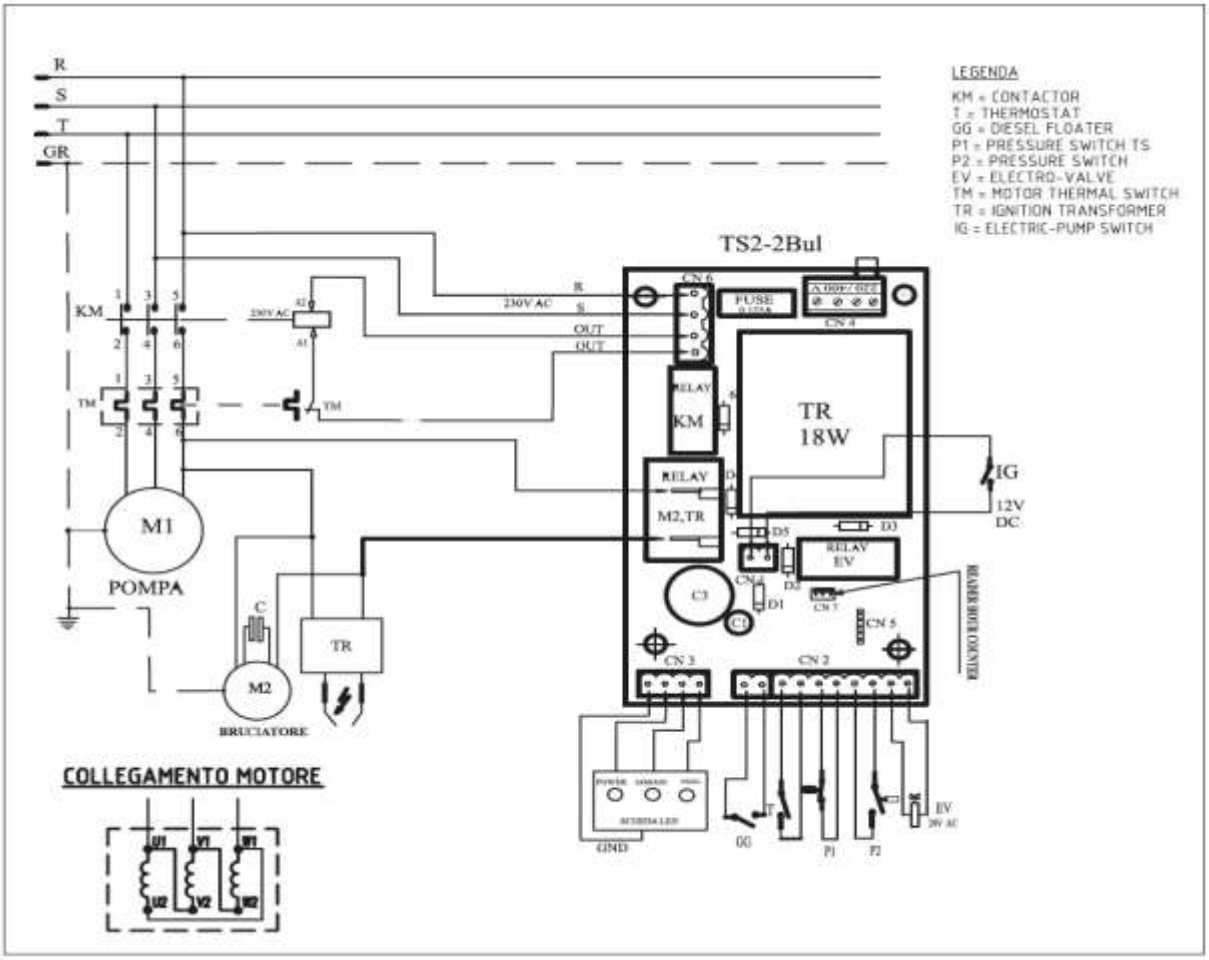
H-200E 380~440V 50/60Hz Standard



LEGENDA

KM = CONTACTOR
T = THERMOSTAT
GG = DIESEL FLOATER
P1 = PRESSURE SWITCH TS
P2 = PRESSURE SWITCH
EV = ELECTRO-VALVE
TM = MOTOR THERMAL SWITCH
TR = IGNITION TRANSFORMER
IG = ELECTRIC-PUMP SWITCH
T2 = EXTERNAL MOTOR TERMAL SWITCH

H-200E 220V 60Hz Standard



Recommended spare-parts

In events where uninterrupted use of the machine is of critical importance, or when operating at remote locations, like in weekends, holidays, in rural areas or on-board ships at sea, it is recommended to stock a few essential spare-parts for field maintenance and repair.

FOR MACHINE:	HIGH PRESSURE NOZZLE X01	PACKING SEAL REP. KIT X03	UN-LOADER VALVE REP. KIT X01	VALVE COMPLETE X03
H-110E 50Hz	700550015	700590071 700590072	700590067	700590065
H-110E 60Hz	700550015	700590071 700590072	700590067	700590065
H-200E 50Hz	700550015	700590132	700590114	700590134
H-200E 60Hz	700550015	700590132	700590114	700590134

FOR MACHINE:	TRIGGER REPAIR KIT X01	INLET STRAINER X02	O-RING QUICK COUPLING X04	O-RING QUICK COUPLING X02
H-110E 50Hz	700551517 700551520	700540033	700540035	700550002
H-110E 60Hz	700551517 700551520	700540033	700540035	700550002
H-200E 50Hz	700551517 700551520	700540033	700540035	700550002
H-200E 60Hz	700551517 700551520	700540033	700540035	700550002

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5. Declaration and Warranty

EU declaration of conformity

CE EU Declaration of Conformity

Product:	**Electric powered** **Heavy duty** **Hot Water high-pressure cleaner**
Type:	H-110E / H-200E, 50/60Hz
Description:	230V 0~, 220V 0~, 380V-415V 0~, 220V-440V 0~, 50/60Hz, IP 54 110 / 200 [bar] 11 / 20 [MPa]
The design of the unit corresponds to the following pertinent regulations:	EC Machine Directive 2006/42/EC EC EMC Directive 2004/108/EC
Applied harmonized standards:	EN 12100-1, EN 12100-2, EN 1829-1/EN 60335-2-79 EN 55014-1, EN 55014-2, EN 61000-3-2
Applied national standards and technical specifications:	DIN EN 60335-2-79
	DEN-SIN – a division Nilfisk-Advance Pte Ltd. No 5 Tuas Ave 2 Singapore 639445 Tel: +65 62681006 Fax: +65 62684916
	Singapore, Jan 2014

Warranty

DEN-SIN warrants all equipment of its manufacture furnished under this agreement to be free from defect in workmanship and material for a period of one year from the date of invoice of the equipment. This warranty does not cover normal wear and tear, consumable items, or part failures caused by (i) accident, (ii) abuse, or (iii) failure to maintain the DEN-SIN system containing the affected parts in accordance with DEN-SIN technical specification. All labour is the responsibility, and the expense of the Buyer. The liability of Seller under this warranty is limited, at Seller's option, solely to repair or replacement with equivalent articles. This warranty is condition upon (a) Seller being notified in writing by Buyer within one week after discovery of defects;

(b) the return of defective articles to Seller, transportation charges prepaid by Buyer; and (c) Seller's examination of such article disclosing to its satisfaction that such defects were not caused by negligence, misuse, improper maintenance, improper installation, accident, or unauthorized repair or alteration.

Accessories or equipment furnished by DEN-SIN but manufactured by others, shall carry the warranty that its manufacturer has conveyed to DEN-SIN, and which may be passed on to the purchaser. The original warranty period of any article, which has been repaired or replaced by DEN-SIN, shall not thereby be extended.

6. Spare Parts Request Form

Company Name: _____

Delivery Address: _____

Country: _____ *Postal Code:* _____

Contact Name: _____ *Contact Number:* _____

Fax Number: _____ *Mobile Number:* _____

Email: _____

S/N	Part Number	Description	QTY	Machine Model or Serial Number
1				
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Special Instructions: _____

_____

DENSO

7. Maintenance Log Book

This maintenance logbook will assist you to keep track on the servicing of your equipment. Please record after service your machine.

Purchase date of the machine:

S/N	Service Description	Date	Remarks
1			
2			
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